

Remarks

I. Introduction

This amendment is in response to the Office Action dated December 1, 2004. The Office Action rejected claims 1, 3-11, 13 and 20-28 under 35 U.S.C. §103(a) as being obvious over applicants admitted prior art (AAPA) in view of U.S. Patent No. 5,841,777 (Cohen). Claim 12 was rejected under 35 U.S.C. §103(a) as being obvious over AAPA in view of Cohen and further in view of U.S. Patent No. 5,295,140 (Crisler et al.).

In response, Applicant has amended claims 1, 18 and 28. Claims 2, 14-17 and 19 were cancelled in a prior Amendment dated October 27, 2003. Claims 29-35 were cancelled without disclaimer or prejudice in a Response to Election/Restriction Requirement under 35 U.S.C. §121 filed June 3, 2003. Claims 1, 3-13, 18 and 20-28 are currently pending and remain for consideration.

II. The Present Invention

The present invention is directed to a technique for reducing jitter in a bi-directional cable-access system. One of the problems with upstream channel communications in a cable-access system is illustrated in Fig. 4 of the present application and described in the specification at page 7. As seen from Fig. 4 and the accompanying description, jitter occurs as a result of shifting time slots within a nominal grant interval. As a result of this shift, voice packets are not received at their expected time, which leads to so-called jitter, or packet delay variation, and an accompanying degradation of service. The present invention solves this problem by establishing jitter windows within the voice region of a transmission frame so as to maintain the packet delay within an acceptable

tolerance. This aspect of the invention is described, for example, in conjunction with Fig. 2A at page 13 of the specification. As can be seen, the establishment of appropriate non-overlapping jitter windows which collectively cover the entire voice regions, results in limiting the jitter to the duration of the jitter window. Thus, even if there is shifting of time slots, such shifting will remain within an assigned jitter window, and as such, the packet delay variation is limited by the size of the jitter window.

Each of the jitter windows in accordance with the claimed invention comprises a plurality of time slots for carrying voice packets. When the time slot carrying a particular call shifts to a different time slot, jitter is limited by shifting to a time slot within the previously assigned jitter window.

III. The Claimed Invention is Allowable Over the Cited Art

The present invention, as claimed, is distinguishable over the cited art for several reasons, as follows.

A. Cohen Does Not Disclose Jitter Windows

First, with respect to claim 1, that claim contains the limitations of a frame “comprising one or more voice regions” and “at least two non-overlapping jitter windows in said one or more voice regions” with “each of said at least two jitter windows comprising a plurality of time slots”. Thus, claim 1 clearly claims voice regions, which are made up of jitter windows, which are further made up of time slots. Thus, claim 1 clearly and distinctly claims a three part frame hierarchy. This three part frame hierarchy of voice regions, jitter windows and time slots is missing from Cohen. The frame in Cohen, as seen in Figure 4, only contains a two part frame hierarchy. The frame (e.g.,

frame 3 401-3) is made up of ABR region 407-3 and CBR region 409-3 (see col. 8, lines 57-65). The ABR region of Cohen corresponds to Applicant's data region and the CBR region of Cohen corresponds to Applicant's voice region (see col. 1, lines 60-64). Thus, Cohen discloses a voice region (409-3) which comprises time slots (406-3, 403'-2, 405'-2). However, Cohen is lacking the intermediate grouping of jitter windows in accordance with the present invention.

Independent claim 9 contains the limitation of "one or more jitter windows comprising a plurality of time slots for carrying voice packets" and so claim 9 also clearly and distinctly claims the three part frame hierarchy discussed above in connection with claim 1 and is allowable for the same reasons. Independent claims 18 and 28 contain limitations similar to claim 1 with respect to the three part frame hierarchy and are allowable for the same reasons as discussed above in connection with claim 1.

The Office Action states that "Cohen teaches grouping constant bit rate and available bit rate data into separate groups ..." and then makes the conclusory statement that "[i]t would have been obvious ... to have established 'jitter windows' to the voice regions of AAPA, in light of the teachings of Cohen, in order to help prevent jitter". However, this statement of obviousness is unsupported by the actual teachings of Cohen.

B. Cohen Does Not Disclose Voice Packet Shifting Between Time Slots

The fact that Cohen is missing jitter windows as discussed above in Section III.A. is not surprising because Cohen has no need for jitter windows. As discussed above, the jitter window in accordance with the present invention is used so that when a call connection is shifted between time slots, such shifting will remain within an assigned

jitter window, and as such, the packet delay variation is limited by the size of the jitter window. Thus, the jitter window is used to reduce the jitter problem when a call connection is shifted from one time slot to another. Cohen does not need to address this time slot shifting problem because Cohen assigns sub-channels for the duration of the call, and is therefore not concerned with shifting time slots (col. 9, lines 32-35). Since channels are assigned for the duration of the call, there is no shifting to different channels and therefore the problem of jitter does not arise and is therefore not addressed.

Each of the jitter windows in accordance with the claimed invention comprises a plurality of time slots for carrying voice packets. When the time slot carrying a particular call shifts to a different time slot, jitter is limited by shifting to a time slot within the previously assigned jitter window. Claims 1, 18 and 28 clearly claim this aspect of the invention by the claim limitation of “when voice packets associated with a call are shifted between time slots”.

Further, claim 9 contains limitations specifically directed to the time slot shifting problem which, as discussed above, is missing from Cohen et al. For example, claim 9 contains the limitations of:

selecting a new upstream channel with at least one idle time slot to accommodate said at least one new voice connection and said one or more existing voice connections,

assigning time slots in said new upstream channel to carry voice packets generated from said new and existing voice connections, such that voice packets from said one or more existing voice connections maintain jitter window assignments in the new upstream channel corresponding to the jitter window assignments in the current upstream channel.

Cohen has no disclosure of selecting a “new upstream channel” and assigning time slots in this new upstream channel “such that voice packets from said one or more existing

voice connections maintain jitter window assignments in the new upstream channel corresponding to the jitter window assignments in the current upstream channel.” Thus, claim 9 is also allowable over Cohen et al. for this reason.

The Office Action states that “Cohen teaches grouping constant bit rate and available bit rate data into separate groups ...” and then makes the conclusory statement that “[i]t would have been obvious ... to have established ‘jitter windows’ to the voice regions of AAPA, in light of the teachings of Cohen, in order to help prevent jitter”. However, this statement of obviousness is unsupported by the actual teachings of Cohen, because there is no problem of jitter in Cohen, and therefore no reason “to help prevent jitter”.

C. Cohen Does Not Disclose Voice Regions Having a Fixed Size

Independent claims 1, 18 and 28 have been amended to add the limitation that the voice regions have a “fixed size”. The CBR regions in Cohen are variable length, and not fixed as now claimed in claims 1, 18 and 28. As described in Cohen at col. 8, line 66 – col. 9, line 31, the system of Cohen adds or removes time slots to the CBR region of the frame, and thus the CBR region of Cohen is variable length. Claims 1, 18 and 28 now specifically claim that the voice regions of the frame are of a fixed size. Thus, claims 1, 18 and 28 are also distinguishable over Cohen for this additional reason.

D. Dependent Claims

For the reasons described above, all independent claims 1, 9, 18 and 28 are allowable over the cited art. All remaining claims are dependent upon an allowable

independent claim and are therefore also allowable. Further, the dependent claims add additional allowable subject matter as follows.

Claims 3 and 20 are directed to a method and network, respectively, in which the length of the jitter windows are established in a particular manner as claimed. The Office Action cites no art that discloses this particular manner of establishing the length of the jitter windows, but merely states that is it obvious. Applicant submits that there has not been a prima facie showing of obviousness with respect to claims 3 and 20.

Dependent claim 5 adds the limitation that the jitter windows are established in one voice region. The Office Action cites no art that discloses this particular manner of establishing the jitter windows, but merely states that is it obvious. Applicant submits that there has not been a prima facie showing of obviousness with respect to claim 5.

Dependent claims 10 and 24 are directed to a particular technique for selecting an upstream channel in accordance with certain criteria. In rejecting claim 10, the Office Action relies on “maintaining correspondence between the connections in the jitter windows” makes obvious “having the number of idle time slots be the same between the current and new upstream channels”. The Office Action fails to cite any prior art which discloses “maintaining correspondence between the connections in the jitter windows” and therefore reliance on this statement for a rejection is improper. This statement is a conclusory statement from the Examiner’s rejection of claim 9, but it is not prior art, and it is therefore an improper basis for rejection of claim 10.

Claims 11 and 21 are directed to a particular technique for selecting a new upstream channel. The Office Action cites Cohen at col. 9, lines 14+ as disclosing

“packet with first fit.” However, the cited section of Cohen discloses adding time slots to a region and does not render obvious selecting a new upstream channel as claimed.

Claims 12 and 22 are directed to a particular technique for assigning a time slot. The Office Action cites Crisler et al. without any particular reference. Assuming that the Office Action is relying on the same section of Crisler et al. as in the prior Office Actions (i.e., at col. 6, lines 65+) as disclosing random time slot assignment, Applicant repeats the argument that the cited section of Crisler et al. discloses waiting for the occurrence of a random access time slot on an inbound communication channel. Waiting for a random access time slot is not the same as randomly assigning an idle time slot. As such, Crisler et al. does not render claims 12 and 22 obvious.

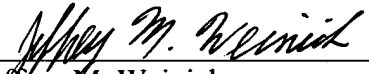
IV. No New Matter Has Been Added

No new matter has been added by this amendment. The limitation of a voice region having “fixed size” is supported by the specification as filed at least at page 12, lines 8-9 and lines 19-20.

V. Conclusion

For the foregoing reasons, the cited art does not render the pending claims obvious. Reconsideration and allowance of all pending claims is respectfully requested.

Respectfully submitted,



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